

**Height and Area**  
**(CTC Balanced Fire Protection Features)**  
**Study Group**

Progress Report – May 2007

**Origins and Background:**

At the Orlando 2006 Code Development Hearing, the Height and Area Study Group was formed for the purpose of examining the contentious Height and Area code change proposals in a more comprehensive way than the code hearing itself could provide.

Kate Dargan (CA State Fire Marshal) and Dave Collins (AIA) each represented several groups that volunteered to be part of this effort and were selected as the Co-Chairs of the “Height and Area Study Group”(SG). This group recommended that the IBC General Committee disapprove the collective proposals for Height and Area so the Study Group could develop recommendations for the Rochester Final Action Hearing.

After the hearing, the SG met once a month from October thru January 2007. The key questions to evaluate were:

1. Was Table 503 consistent with the statement that “no building is now being built larger than allowed in at least one of the legacy codes”?
2. Are any buildings too large or too high in the current code?
3. Should there be any changes to Table 503 and/or the height and area modifiers based on our analysis?
4. Are height and/or area allowances currently appropriate?

We began with a review of the legacy codes consolidation and IBC development. The foundation of the consolidation was the concept that as the IBC began to be adopted across the previous regional boundaries, the new code should not generally create non-conforming buildings in legacy regions.

The consolidation starting point was developed by the ICC Drafting Committee and stated that for each occupancy and construction type, the largest maximum allowable area in any one of the codes should be the prevailing value. Once that area was determined, then the Table 503 tabular values could be reverse-calculated using the BCMC protocol to meet the non-conforming objective.

The Study Group debated this approach and reconstructed Table 503 independently. At the conclusion of that effort, we discovered that 48 of the 225 cells in Table 503 did not meet the “largest maximum area” statement in that the building areas were larger than any legacy code, while 10 cells were smaller than any of the legacy codes.

We then asked ourselves: “Is the best way to address this issue and the other questions on our list to work at revising the table and modifiers, or to look at the bigger question of building safety in a more comprehensive way?” We decided to correct some of the more significant concerns identified with Table 503 by developing several code change proposals that immediately addressed these concerns. However, we realized that it could take a significant amount of time and energy to thoroughly review and modify Table 503 and the related height and area modifiers at the risk of changing the basic concepts put forth by the ICC Drafting Committee that developed Chapter 5.

We concluded that the better approach was to examine the broader issues and we changed gears from a backwards-looking perspective to a forward-looking one that asked “What can we do to improve building safety using the concepts of balanced fire protection?”

As part of this change, we requested and received a new identity and focus from ICC CTC and were renamed the Balanced Fire Protection (BFP) Features Group.

### **Current Group Vision:**

The Study Group notes that Table 503 is founded upon traditional thinking as it relates to urban conflagrations, passive fire protection systems, and a compartmented approach to fire loss reduction. To address building safety holistically and efficiently incorporate changing technology, we are better served to make a significant shift in Chapter 5 (Height and Area) and are pointed toward a philosophical approach that says:

*“What the Study Group intends to accomplish is to revamp the way height and area is addressed in the code by focusing less on the numbers in Table 503 and more on the components of balanced fire protection to create a holistic approach to improving the building safety performance system.*

*This approach includes the traditional components of passive protection and compartmentation as well as active systems, all of which needs to be supported by a robust inspection and maintenance infrastructure and an effective emergency response system.*

*We acknowledge that building safety has been improving for the past few decades but believe that this trend can be accelerated in the near future through this effort.”*

### **Concept Development Objectives:**

1. Create a set of requirements that result in buildings that meet an acceptable level of fire safety for communities, occupants and emergency responders.

2. Incorporate methods, materials, and systems that are flexible enough to adapt to differing community conditions, changing materials and methodologies, and individual building needs.
3. Develop building code requirements that are simple, straightforward, and understandable.

### **Key Development Concepts:**

- “Building Safety” is defined as the aggregate effectiveness of the mitigation features in a building that are provided to protect the structure, occupants, emergency responders, and property from losses associated with anticipated hazards primarily due to fire exposure and subsequent collapse.
- The Active - Passive - Emergency Response features form a system for the building hazard mitigation sequence and also comprise the Balanced Fire Protection components.
- The goal of building safety is best achieved through the balanced interaction of each of the hazard mitigation features (Active and Passive and Emergency Response) to produce an acceptable level of risk (level of safety).
- Automatic sprinkler protection is becoming so widespread in almost all new occupancies (both code driven and market driven) that Chapter 5 should become more straightforward with the assumption that more use of sprinklers will be required. Sprinklers have shifted from a primarily “property protection” function to a multipurpose role of providing life safety for occupants and emergency responders and property protection for the building and its contents. They need to be properly integrated with passive mitigation features to achieve the appropriately balanced fire protection solution.

- “Building Safety Success” can be defined as meeting the goals for the reduction of life and property loss that are acceptable and economically supportable. This is the core concept of acceptable risk.
  
- The determination of acceptable risk for building safety is a process at each level of decision making, i.e. national, state, community, and individual, that identifies and analyzes the building’s hazards and the potential mitigations of those hazards that positively impact building safety and also considers their probability for successful performance, and then concludes what are the appropriate mitigations to apply for each hazard to achieve the desired goals.
  
- Acceptable building safety risk is that level of anticipated loss that each entity impacted can accept if a hazardous event occurs. It is based on the probabilities that the various mitigation strategies will perform as intended and it can be measured as a quantitative value, a qualitative value, or both.
  - On a national scale, as well as a state scale, this loss may be assessed using statistics on deaths/injuries and property loss collected by the states and compiled and projected at the national level.
  - On a community scale, this loss is usually represented by the community loss goals while considering public welfare as measured against the cost of providing a prevention and emergency response system.
  - On an individual scale, acceptable risk is often represented as a contractual condition such as an insurance policy entered into between a building owner/occupant and insurance provider.

### **Concept Development Deliverables**

We are dedicated to both short and long term code proposals to address these objectives. The short-term proposals are those defined as those developed for the next 18 month code cycle that results in the 2009 edition and those for the subsequent two 18 month code cycles that produce the 2012 edition.

It is our goal to produce the framework for this effort for the next 18 month (2007/08) code cycle so the issues can be evaluated and discussed by the membership at large. We are developing several proposals in the following areas for this year's submittal deadline of August 20. This should encourage a vigorous discussion of these proposals for the 2009 edition. It may be possible to produce a document containing the comprehensive replacement for Chapter 5. It is our intent to continue refining these proposals with wide discussion for the 2012 version of the IBC and to support a holistic approach for improved building safety for the 2012 edition. Key features of this holistic effort include examination of:

1. Exiting
2. Compartmentation
3. Smoke Management
4. Automatic Sprinklering
5. Fire-Resistive Construction
6. Structural Integrity
7. Better Inspection and Maintenance Compliance

In the short term, to partially address some of the more significant concerns with Table 503 today, we are proposing height reductions for unrated construction types IIB and IIIB, in overall height allowed. Because of the limitations to proposals in the part of the cycle ending in Rochester, NY, our changes are not complete in the current code changes and will be submitted in August to complete these changes.

In the long run we have begun to review the objectives more holistically and will provide changes for the 2009 process that the membership can view and comment on. While this work is difficult and requires a great deal of effort on the part of the committee, we are moving positively to affect better building practices in the future.

## **Conclusion:**

The issue of height and area as it relates to building safety has been a contentious one since the merging of the legacy codes. In-depth analysis of this issue continually opens the door to a bigger question of how to improve the existing level of building safety, primarily focused on the concept of balanced fire protection. We feel that the most valuable work we can provide is a productive way to address this larger question. It is time to suggest a fundamental shift in the code to more clearly define our building safety goals and more effectively utilize the variety of mitigation methodologies we now have at our disposal to achieve those goals. Your support for this effort and positive contribution to the discussion is deeply appreciated.

For more information on the CTC Balanced Fire Protection Features Study Group, be sure to visit: <http://www.iccsafe.org/cs/cc/ctc/Balanced.html>.